Integrating Social Needs Screening and Community Health Workers in Primary Care: The Community Linkage to Care Program

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Abstract

Clinic-based social needs screening has been associated with increased access to social services and improved health outcomes. Using a pragmatic study design in an urban pediatric practice, we used logistic regression to identify factors associated with successful social service uptake. From December 2017 to November 2018, 4948 households were screened for social needs, and 20% self-reported at least one. Of the 287 households with unmet needs who were referred and interested in further assistance, 43% reported successful social service uptake. Greater than 4 outreach encounters (adjusted odds ratio = 1.92; 95% confidence interval = 1.06-3.49) and follow-up time >30 days (adjusted odds ratio = 0.43; 95% confidence interval = 0.25-0.73) were significantly associated with successful referrals. These findings have implementation implications for programs aiming to address social needs in practice. Less than half of households reported successful referrals, which suggests the need for additional research and an opportunity for further program optimization.

Keywords

social determinants of health; social needs; community health workers; implementation science; primary care

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In the United States, 1 in 5 children live in poverty with unmet basic social needs.[1] Referred to as the social determinants of health[2] and are defined by the World Health Organization as "the conditions, in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life," there is clear evidence that unmet social needs influence health outcomes.[3,4] For example, pediatric populations with unmet social needs are associated with an increased burden of asthma, obesity, infant mortality, and poor developmental outcomes.[5] In 2016, the American Academy of Pediatrics recommended that providers screen for social needs during visits.[1] In addition, several studies suggest that screening for families' or caregivers' social needs in ambulatory settings leads to increased utilization of social services,[6,7] which in turn is associated with improved health outcomes.[8–10]

Community health workers (CHWs) have been utilized globally in various settings for over a century and are uniquely positioned to work with and within health systems to provide a direct linkage from clinical care to community resources.[11–13] Following passage of the Affordable Care Act in 2010, renewed interest and funding emerged in the United States aimed at improving outcomes and reducing costs through innovations and reforms in health service delivery such as the integration of CHWs in primary care.[14–16] Previous efficacy studies suggest that the integration of CHWs in primary care contributes to improved health outcomes, including reductions in maternal and child mortality, improved diabetes and hypertension management, increased cancer screening, and better asthma control.[17–21] There is also mounting evidence that CHWs play a unique role in addressing health disparities and inequity through addressing unmet social needs.[22] Randomized controlled trials comparing CHWs or lay patient navigators to usual care addressing social needs have demonstrated improvements in health outcomes and reduction in unnecessary health care utilization.[9,19,20,23] Despite the evidence, large-scale integration and adoption of CHWs within the US health care system to address social needs remains to be seen,[24] and key implementation considerations in practice critical to successful scale-up are less clear.[25]

Considering the impact social needs have on health, evidence-based recommendations for providers to screen for social needs, and research supporting the efficacy of using CHWs to link patients to resources, there remains a knowledge gap on how to implement programs that translate this evidence base in real-world settings for both single practices and large health systems.[25] Pragmatic study designs afford the potential to assess predicators and/or factors on implementation in real-world contexts.[26] The objective of this study was to assess the effectiveness of a pilot, the Community Linkage to Care (CLC) program, which integrates routine social needs screening and CHW referral assistance in a primary care setting and to describe demographic and program factors associated with effectiveness.

Methods

Study Population and Setting

This was a pragmatic study using data prospectively collected from December 1, 2017, to November 30, 2018, from patients attending an urban ambulatory pediatric clinic. The clinic is a Federally Qualified Health Center and teaching site with Pediatrics, Internal Medicine,

and Obstetrics/Gynecology specialties and a member of a Bronx Community Health Network (BCHN). BCHN is a federally funded health center and community-based organization that serves as a CHW hub, recruiting, training, and managing CHWs who are integrated into the health centers' care teams. The clinic's ambulatory network includes over 20 sites in Bronx County, New York, delivering primary care in this area and affiliations with local hospitals and a medical school.

Approximately 42% of children in the Bronx live below the federal poverty line,[27] and 28% live in food-insecure homes.[28] In addition to high rates of child poverty, the Bronx has the highest rates of preterm births, infant mortality, childhood obesity, asthma, and teen births in New York City and consistently ranks last among 62 counties in New York State according to the County Health Rankings.[29] The neighborhood being served by the clinic has a particularly high burden of poverty and adverse health outcomes within New York City.[30]

CLC Pilot Program Description

The CLC pilot program was developed as part of a larger health system–wide initiative launched in 2016 that introduced standardized social needs screening and referral support within the health system's ambulatory network. The health system adapted a standardized screening tool into the electronic health record to assess for the following social need categories: housing security, housing quality, benefits (such as utilities), food insecurity, transportation, medication or health care access, childcare or eldercare assistance, legal services, relationship concerns, and safety issues. In 2017, the authors collaborated to develop a pilot program, the CLC program, within this larger health systems initiative with key stakeholders, including community-based organization partners, clinical teams, and health system leadership. The CLC pilot aimed to define essential program components that would optimize integrated social needs screening and linkage to resources using clinic-based CHWs (Figure 1). This multidisciplinary clinic-based team developed and obtained consensus around 6 program components:

1.   *Screening workflow* was developed and tested through an iterative approach with administrative and clinical team feedback and involved identifying who to screen, at what frequency, and by which staff members. The pilot program eventually decided to focus on social needs screening at annual well-child visit frequency. Screens are provided at check-in and completed using paper-based forms. These results are then entered into the electronic health record in a screening section with clinical providers reviewing results with family prior to making any referrals.

2.   *Referrals* are made to trained and supervised CHWs embedded within primary care centers and provide assistance linking households to community resources. Providers review the results of the screen and ask families if they would like additional assistance. All safety concerns (eg, domestic violence) are automatically referred to social work. The program helped develop an electronic referral order within the health systems' electronic medical record to facilitate this process.

3. *CHW accompaniment* involves active follow-up and support by CHWs with families to assess status of referrals and progress on addressing social need(s). CHWs provide systematic follow-up, either in-person or via telephone encounters, to assess the status of each referral.

4. *Provider champion(s)* are full-time clinicians based at practice who serve as clinical contact, mentor, and/or coach to support CHW team integration and lead performance improvement (PI) initiatives.

5. *Administrative liaison(s)* include the clinical director and administrator providing leadership and program buy-in and support.

6. *Performance improvement* activities are integrated within a clinic's ongoing, established quality improvement activities and structure including a monthly meeting structure. Pi-based measures and quality improvement cycles are reported routinely.

In addition to identifying key program components, we developed a REDCap database for CHWs to capture key metrics and facilitate patient follow-up and tracking, finalized a clinical workflow, and established CHW referral outreach protocols.

Data Collection

All children presenting for routine well-child examinations from December 1, 2017, to November 30, 2018, at the CLC pilot site were eligible for program participation and included in the analysis. All data utilized for this study were sourced from the electronic medical record and the REDCap CLC program data for social needs screening and referral data, respectively.

Social Needs Screening Data.—Social needs screening data are extracted from the health system's electronic medical record, Epic. The social needs screen is a 10-item screening instrument adapted from the Health Leads Toolkit.[31] As mentioned above, screens are administered during well-child visits by nursing staff in the patient's preferred language, and results are entered into the medical record for providers to review during visit (see Figure 2). Screening results are extracted monthly by an analytics team and provided to administrative and medical directors within the ambulatory network for PI activities. This report provides the following: dichotomous result for each social need category, date of visit encounter, and medical record number, which facilitates linkages to other databases.

CHW Referral Data.—The CLC REDCap electronic data capture tool is utilized by CHWs to collect program reporting measures including demographics and identified social needs and to track the status of referral(s).[32] Only households that had a positive screen, defined as a "yes" to any of the screening questions, and that requested assistance would be referred to a CHW (or social worker in the event of a safety or violence issue identified). Families that had an initial encounter with a CHW would then be entered into the REDCap database to facilitate support, or accompaniment, and assess program outcomes.

Primary Outcome and Covariates

The primary outcome for this study was referral status related to social service uptake and was defined as either "successful" or "unsuccessful." "Successful" was obtained by the CHW from caretaker self-report as to whether the household accessed, obtained, or utilized recommended service/support, or completed an application or form (paper or online) related to addressing relevant social need(s). For multiple social needs, application of the "successful" definition required achieving "successful" linkage on any of the social need categories identified by the family. "Unsuccessful" designation included referrals that did not result in "success" as defined above or referrals that were lost to follow-up or did not present for CHW assistance after 60 days from the initial CHW encounter despite multiple follow-up attempts.

Independent covariates considered for this analysis were extracted from REDCap database based on caregiver self-report and included child sex, child age, race/ethnicity, preferred spoken language of caregiver, caregiver education level, and social need categories including housing, utilities, food insecurity, childcare assistance, legal services, transportation, and employment or vocational training.

Power Calculation.—We performed a post hoc power calculation for the primary outcome referral status, as this was a pragmatic design using existing and already collected program data. Based on the observed sample size of 287, 50% exposure prevalence (eg, equally sized groups), 80% power, and an α of 0.05, we have statistical power to detect a relative risk >1.325 and <0.675, suggesting we have adequate power to detect strong, but not modest or weak, associations.

Statistical Analysis

Bivariate analyses compared the dichotomous primary outcome, referral status, and each variable using either χ^2 or Fisher exact test, as appropriate, based on stratum-specific sample sizes. Based on nonnormal distributions for age, outreach encounters, follow-up time, and total number of social need categories, we divided these variables into categories that were programmatically meaningful prior to regression analyses. Based on limited sample size, any variables with >10% of data missing or "not disclosed" were not included in multivariable analysis, including caregiver education level and race/ethnicity.

To assess for possible confounding, unadjusted odds ratios (ORs) were computed and reported for all variables regardless of bivariate significance level and were compared with a fully adjusted model. Any difference >20% in the log odds prompted the covariate to be included in the adjusted model. No meaningful interactions were identified among covariates. To construct a final multivariable logistic regression model, we used backward stepwise regression with .20 significance level for inclusion in the final model. The final adjusted model was then assessed for goodness-of-fit using Hosmer and Lemeshow fit test and area under the receiver operating characteristic curve. The final model was found to have "acceptable" discrimination" within predefined range.[33] Last, we conducted diagnostic statistics on covariate patterns, and no evidence of potential influential observations were identified. This study was reviewed and approved by the Albert Einstein College of

Medicine Institutional Review Board (#2017-8434) and Montefiore Medical Group Research Committee. All analyses were performed using Stata (Stata Statistical Software: Release 15; StataCorp LLC, College Station, TX).

Results

Over the 12-month pilot period, 4948 households (72%) were screened for social needs out of a total of 6584 eligible well-child visit opportunities, with approximately 20% of households reporting one or more unmet social need(s). These 984 positive screens resulted in 287 households receiving CHW assistance (Figure 3) or ~29% of households with 1 or more unmet social needs. Table 1 summarizes demographic characteristics of caregivers/patients who requested a CHW referral and were found to be generally representative of the underlying clinic population. CHW referrals resulted in 856 outreach attempts with a median of 3 attempts (range = 1-13) per referral (Table 2). There were 39% of households that identified 2 or more social needs with the 3 most common social need categories reported to be housing stability and quality (40%), benefits assistance (19%), and food insecurity (15%). Of the households referred to the CHW, 43% had "successful" referrals (Table 3). We observed that ~49% of "unsuccessful" referrals were the result of the family being disconnected from the CHW.

Bivariate analyses comparing successful and unsuccessful referrals identified follow-up time (<30 days vs   30 days) as statistically significant associated with referral success (P = .01). Table 3 summarizes both unadjusted and adjusted odds ratios (aORs). The adjusted model included child age, preferred spoken language of caregiver, outreach attempts, and follow-up time covariates. Households that had 4 or more outreach attempts were more likely to report a successful referral compared with those having fewer than 3 outreach attempts, in an adjusted model (aOR = 1.92, 95% confidence interval = 1.06-3.49). Households that were followed for   30 days were less likely to have a successful referral compared with those followed for fewer than 30 days in adjusted model (aOR = 0.43, 95% confidence interval = 0.25-0.73).

Discussion

This study describes an assessment of a pilot program aimed to integrate social needs screening and referral assistance using CHWs as part of routine, quality primary health care. As part of this pilot, almost 5000 households were assessed for unmet social needs at one pediatric practice over a 12-month period. An unexpected finding included the observation that only 29% of households that self-reported one or more social needs requested a referral to a CHW for assistance. This was a striking finding that requires further investigation, as the study did not collect any additional information that might provide more information on reasons why households either accepted or declined CHW assistance. With regard to our primary outcome, we observed that ~43% of referrals resulted in households obtaining resource(s) as a result. We also found that over half of unsuccessful referrals were due to households being disconnected from the CHW after multiple outreach attempts. Multivariable analyses highlighted important programmatic factors that are associated with referral outcome status and may improve effectiveness and efficiency, including maximizing

outreach attempts within a short period following referral (<30 days). CHWs and those involved with CLC program development had remarked that these associations seemed consistent with experience in practice in that follow-up beyond 30 days was less successful and suggested challenges due to either communication, engagement, or perceived acuity of issue relative to other life events. Conversely, it was possible that frequent encounters with a patient signaled adequate communication, high engagement, and high acuity of social need. No particular social need, total number of social needs, or patient demographics had a statistically significant association with referral status outcome.

Although there are limited peer-reviewed results for comparison, these findings are consistent with similar evaluation data reported. It is challenging to compare social needs prevalence, observed to be 20% in our sample, across studies due to the heterogeneity in screening instruments used (multiple social need categories vs single domains), frequency of screening, screening population goal (universal vs targeted), setting (hospital vs ambulatory), population screened (pediatrics vs adult), and underlying population characteristics.[34,35] A study using a similar Health Leads–adapted screening tool and based at 3 Boston-based primary care centers reported 35% of 5125 adults participants having one or more social needs over a 3-year period. We observed similar findings in terms of patients who requested assistance when comparing 2 recent studies that observed that between 15% and 27% of participants requested referral help for unmet social needs.[36,37] Two recent systematic reviews, focused on practices in the United Kingdom and the United States, both observed a dearth of studies reporting referral outcomes.[34,35] In the UK review, only 3 of 15 studies meeting inclusion criteria reported on whether a patient "attended a prescribed activity/service," and these results ranged from 42% to 48%.[34] The US-based systematic review included 7 studies focusing on multiple social determinants of health screening domains in primary care settings that reported either "successful" community resource enrollment or contact, with reported results ranging from 32% to 64%.[35] Our referral outcomes for the CLC pilot were within the range of other program results from both the United States and United Kingdom. Last, to our knowledge, there is limited peer-reviewed literature describing demographic and program factors that influence outcomes of the social needs referrals that are described in this study making comparison difficult.

This study has limitations related to its observational and pragmatic design. First, there is no clear comparison group, so we could not assess whether the CLC pilot was more effective compared with other programs. At the time of pilot launch, there were no other sites conducting similar, routine screening and using CHWs that tracked outcomes. In addition, we have limited statistical power due to a fixed sample size to assess potential predictor(s) of the outcome, and as a result, we were not powered to detect weak or modest effects. Last, some variables of interest had high degrees of missing data (eg race/ethnicity and educational status) and these were not assessed in the models; currently, our health system has made decreasing the amount of missing race/ethnicity data a system-wide priority. As noted in our results, we estimated that 28% of households did not receive social needs screening on a routine well-child visit (<0.5% households declined screen), raising concern for selection bias. We did not have sufficient data to understand or compare the characteristics of the 28% of households that did not receive a screen, something we plan to assess in future research. All data collection accrued as part of standard patient care and was

conducted by non-research staff. Nurses entered social needs screening information in the electronic medical record, and a CHW recorded referral data in REDCap. Though data entry safeguards were built into both systems and data were reviewed regularly by investigators for possible errors, errors and misclassification bias was possible. Furthermore, all data were based on caregiver responses raising the possibility of self-report bias, and it is possible families underreported social needs and/or unsuccessful referrals based on sensitive nature of subject, perceived stigma, or disclosure concerns. Outcome definitions might also be limiting and may underestimate "true" magnitude of effect, as the CLC pilot defines referrals when the household is disconnected from program as "unsuccessful." It is possible that a meaningful proportion of those referrals resulted in successful outcomes. Despite these limitations, we believe our results provide useful information.

Social needs affect children's overall health, and integrated screening and referral assistance with CHWs to address unmet social needs is one approach to mitigate this issue. More research is still required to understand how to best translate evidence-based interventions in real-world primary care practice. Our study provides insight and highlights important programmatic factors that should be considered for both improvement and replication. More research is required to advance understanding on how effective programs are generalizable and scalable across health systems. The current interest of providers, clinics, and health systems around addressing social needs in the health care setting provides a watershed moment in reimagining primary care. This interest coupled with implementation research to guide practices will result in making addressing unmet social needs a routine element of quality primary care.

Acknowledgements

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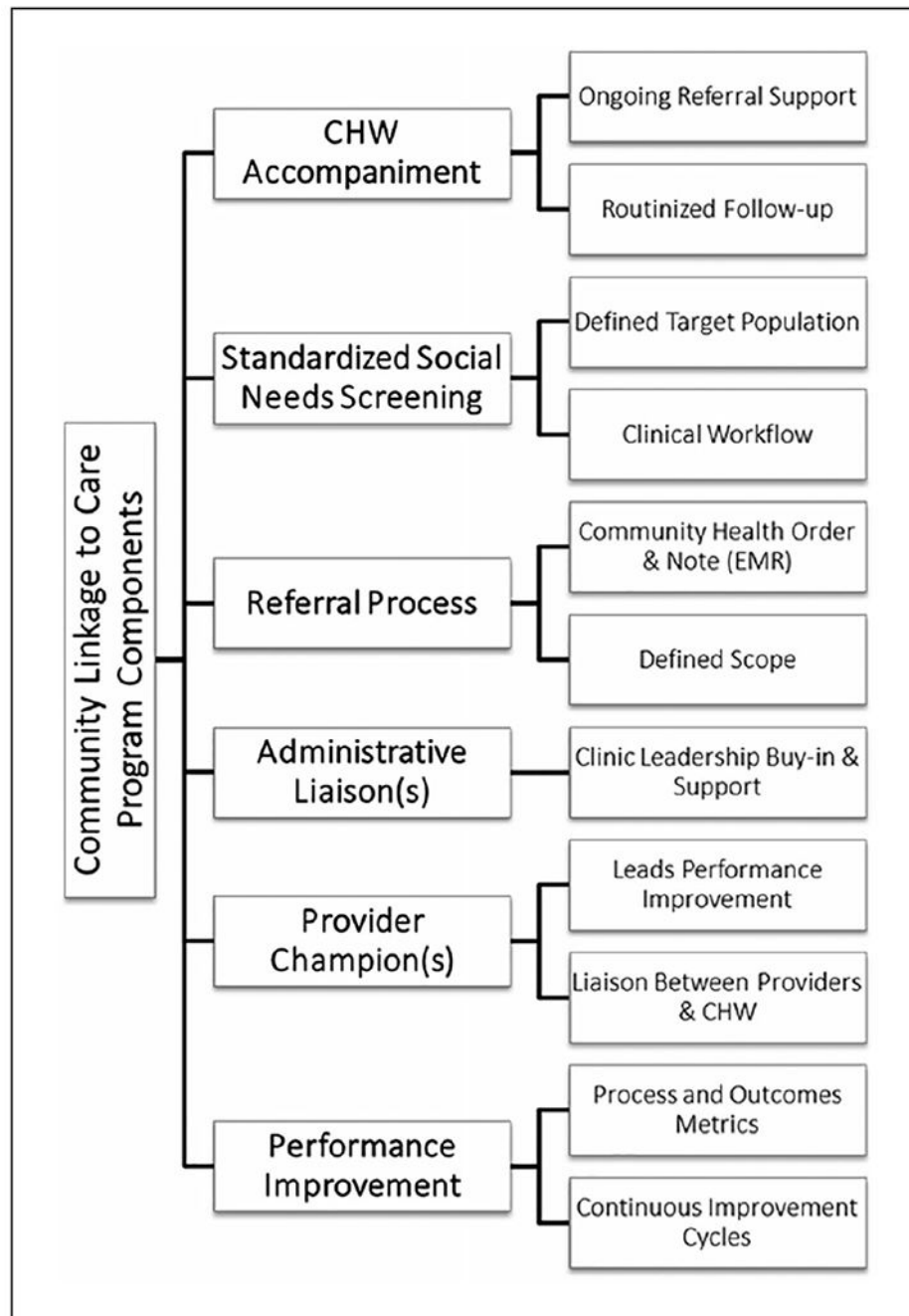
Figure 1.
Community Linkage to Care Program components.
Abbreviations: CHW, community health worker; EMR, electronic medical record.

Figure 2.
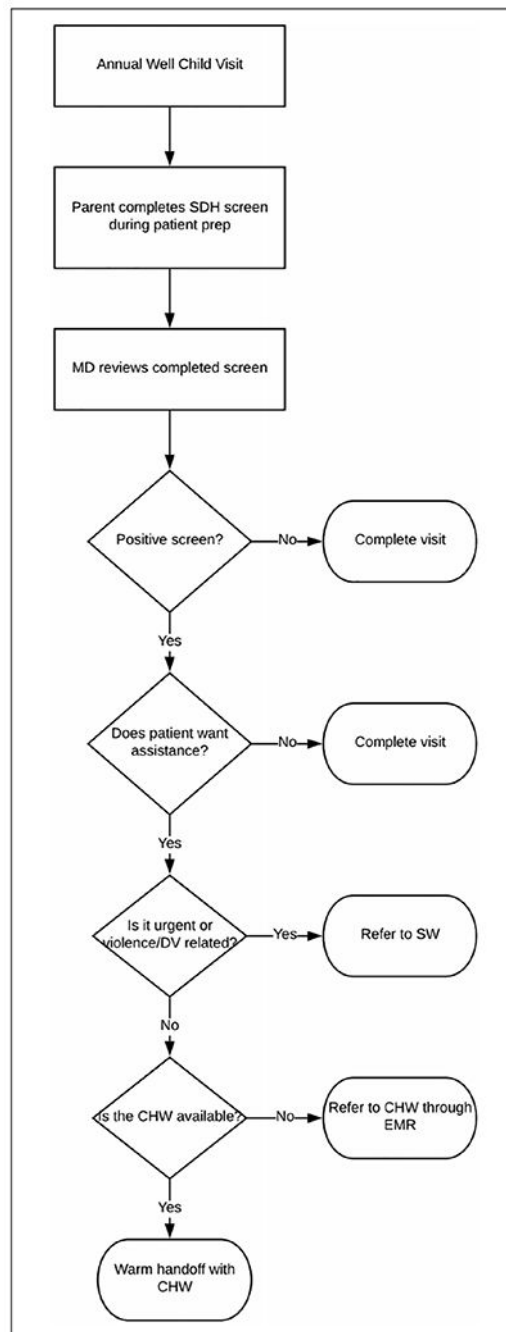Community Linkage to Care social needs screening clinic workflow.
Abbreviations: SDH, social determinants of health; DV, domestic violence; SW, social worker; CHW, community health worker; EMR, electronic medical record.
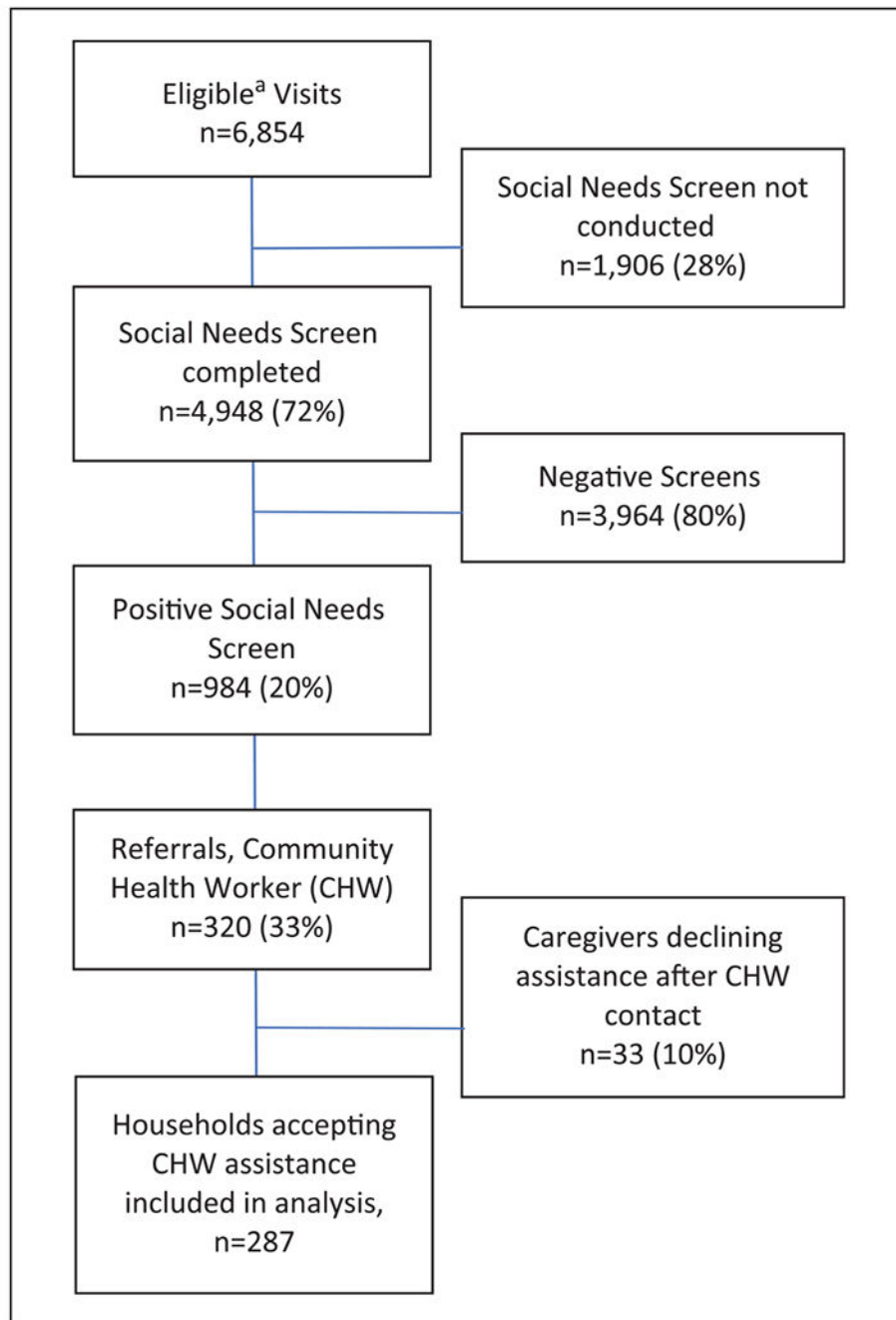
Figure 3.
Community Linkage to Care Program participants from December 1, 2017, to November 30, 2018.
[a]Eligible = defined as a newborn visit and then annual well-child visit.

Table 1.

Characteristics of Community Linkage to Care Program Participants (N = 287)[a].

Child sex	
Female	144 (50)
Male	143 (50)
Child age in years, median (IQR)	6.7 (2.4-12.7)
Race/ethnicity	
Hispanic	96 (33)
Non-Hispanic, black	76 (27)
Non-Hispanic, multiracial	22 (8)
Not disclosed	93 (32)
Preferred spoken language, caregiver	
English	219 (76)
Spanish	64 (23)
Other	4 (1)

Abbreviation: IQR, interquartile range.

[a]All data are presented as n (%) unless otherwise indicated.

Table 2.

Descriptive Summary of Community Linkage to Care Program Referrals from December 1, 2017, to November 30, 2018 (N = 287) [a].

Households requesting CHW assistance	287
Outreach attempts between CHW and household, total (median, range)	856 (3, 1-13)
Initial encounter method	
In-person (warm hand-off)	18 (6)
Phone	269 (94)
Follow-up time [b] in days, median (25th-75th IQR)	46 (25-67)
SDH needs reported by household	
Total number of social needs categories [c] (range)	511 (1-6)
1	166 (61)
2-3	97 (32)
4	24 (7)
Housing	202 (40)
Benefits (public assistance)	96 (19)
Food insecurity	78 (15)
Childcare assistance	48 (9)
Legal	34 (7)
Transportation	22 (4)
Utilities	21 (4)
Employment services	10 (2)

Abbreviations: CHW, community health worker; IQR, interquartile range; SDH, social determinants of health.

[a] All data presented as n (%) unless otherwise indicated.

[b] Follow-up time define as time between initial encounter with household and CHW to time at which referral closed by CHW.

[c] Ten social need categories on screening instrument, positive screen requires 1 or more "yes" responses to any need categories.

Table 3.

Correlates of "Successful" Referral for Community Linkage to Care Program From December 1, 2017, to November 30, 2018 (N = 287).

	Successful, n (%)	Unsuccessful, n (%)	Unadjusted Analyses			Adjusted Analyses[a]		
			Odds Ratio	95% CI	P	Odds Ratio	95% CI	P
Total	124 (43)	163 (57)						
Child sex								
Male	66 (46)	77 (54)	Ref					
Female	58 (40)	86 (60)	0.77	0.49-1.26	.32			
Child age								
<4 years	50 (48)	55 (52)	Ref			Ref		
4 years	74 (41)	108 (59)	0.75	0.46-1.22	.25	0.72	0.44-1.19	.20
Preferred spoken language								
English	88 (40)	131 (60)	Ref			Ref		
Spanish	34 (53)	30 (47)	1.69	0.96-2.95	.07	1.68	0.94-2.99	.08
Outreach attempts, n								
1-3	91 (41)	132 (59)	Ref			Ref		
4	33 (52)	31 (48)	1.5	0.88-2.70	.13	1.92	1.06-3.49	.03
Follow-up time, days								
<30	49 (54)	41 (46)	Ref			Ref		
30	75 (38)	122 (62)	0.51	0.31-0.85	.01	0.43	0.25-0.73	.002
Initial encounter method, n								
In-person (warm hand-off)	9 (50)	9 (50)	Ref					
Phone	115 (43)	154 (57)	0.75	0.29-1.94	.55			
Social needs identified, n								
1	73 (44)	93 (56)	Ref					
2-3	40 (41)	57 (59)	0.89	0.54-1.50	.67			
4	11 (46)	13 (54)	1.08	0.46-2.54	.86			

Abbreviations: n, total number; CI, confidence interval; Ref, reference group.

[a]Model adjusts for child age, preferred spoken language, outreach attempts, and follow-up time included based on backward stepwise regression.